

direction on the night of the 22d and morning of the 23d while decreasing its rate of progress. Then in the afternoon of the 23d and on the 24th it remained almost stationary near 130° longitude E. and 16° latitude N. On the 25th it began to move westward and so rapidly that from 2 p. m. of the 25th to 6 a. m. of the 26th its rate of progress was about 26 miles per hour, a very extraordinary velocity for our latitude. This was the more remarkable because while crossing Luzon with such a velocity it was only a shallow depression of no great importance.

The center of the depression passed about 80 or 90 miles to the north of Manila in the early morning of the 26th moving west. Once in the China Sea it increased again in intensity and took a southwesterly direction, until it probably filled up on the 29th not far from 110° longitude E. and 8° latitude N.

The second typhoon of the month was shown for the first time by our weather maps at 6 a. m. of the 28th near 132° or 133° longitude E. and 10° latitude N. It

moved west by north and traversed the Visayan Islands on the 29th through southern Samar, northern Leyte and northern Panay. After passing between Mindoro and Cuyo in the early morning of the 30th it inclined somewhat to the north, and at the time we are writing these notes (December 2), the center is still over the China Sea, about 300 miles to the west of Luzon and to the east-southeast of the Paracels, moving very slowly and possibly with a tendency to incline still more to the north.

We may add that at the end of the preceding month of October a typhoon was noticed moving northward about 150 or 200 miles to the east of Luzon, and that it recurved northeastward on the 31st of October to the east of Balintang and Bashi Channels. The position of the center at 6 a. m. of October 31 to November 2 was as follows:

October 31, 6 a. m., 20° 50' latitude N., 125° 45' longitude E.  
November 1, 6 a. m., 25° 50' latitude N., 131° 10' longitude E.  
November 2, 6 a. m., 35° latitude N., 145° longitude E.

## DETAILS OF THE WEATHER IN THE UNITED STATES

551.506 (73)

### GENERAL CONDITIONS

By ALFRED J. HENRY

The outstanding feature of the month was the establishment on the 13th of anticyclonic conditions over the Great Basin and the continuance of these conditions with but little change until the close of the month.

Another way of expressing this fact is to say that on the 13th a pronounced flow of cold polar air descended from the Canadian Northwest upon the northern Rockies and the Great Basin. This mass of cold air must have extended upward to a considerable altitude, since instead of skirting the eastern slope of the mountains it overrode them and settled over the Great Basin as before stated. From that region as a pivoted point detached masses of cold air moved southeastward on various subsequent dates overflowing the Gulf States and the lower Mississippi Valley, thus preventing the development in or the movement of cyclonic systems through that region.

This pressure distribution—high centered over the Great Basin with high though diminishing pressure thence southeastward—was effective in preventing precipitation in southern and central California and particularly in the Gulf States and lower Mississippi Valley.

The month as a whole must be classed as fairly warm and dry. The usual details follow.

### CYCLONES AND ANTICYCLONES

By W. P. DAY

There was a marked increase of weather activity during November as compared with October, at least over the United States. This is shown in part by the charting of 19 well-developed LOWS against 14 during the preceding month and 15 HIGHS compared with 11. There were no HIGHS of the Hudson Bay type, which with others were effective during October in holding up and deflecting the normal movement of LOWS. The plateau HIGH was well developed during the latter half of the month and the LOWS made a corresponding shift from the North Pacific to the Alberta type or to developments east of the Rockies

### FREE-AIR SUMMARY

By V. E. JAKL

In the upper-air averages for the month there were no important departures in any of the weather elements, except that all stations showed a decidedly stronger wind movement than usual throughout the vertical extent of the observations. (See Tables 1 and 2.) Temperature departures for all altitudes observed over the region represented by kite observations were substantially the same as those for the surface (see Chart III), the departures being as a rule quite uniform with altitude and generally positive and of small value. At Due West and Royal Center the temperature at all levels was normal to slightly below normal, as distinguished from the higher than normal temperature at all the other stations. The tables of average relative humidity and vapor pressure for the different stations show no important features, except as they indicate a general slightly drier condition aloft than is normal for the month.

Winds were practically normal in direction for all levels, the upper air resultants for the month determined from kite and pilot balloon observations over the middle and eastern portions of the country showing a general westerly drift. Above 1,000 meters there was a slight but general and definite northerly component to the winds over most stations, while in the levels embraced by the first thousand meters above sea level an average movement from about southwest was prevalent. This general westerly tendency of the winds probably extended to the Pacific coast, as pilot balloon observations at San Francisco gave resultant winds from approximately northwest to a considerable altitude.

Except over Key West and San Juan, winds aloft having an easterly component were almost entirely absent, one or two observations each of easterly winds at high altitudes being reported from Groesbeck, Memphis, and San Francisco. Over Key West and San Juan, the resultants of pilot-balloon observations showed deep northeasterly and southeasterly winds respectively.

The principal characteristic of the wind records is the frequency with which strong upper-air winds occurred,

especially from directions between north and west. Velocities varying from 30 m. p. s. to 50 m. p. s. were reported on various dates from all portions of the country covered by aerological observations, in some instances the high winds being observed as low as 1,000 meters altitude, and in others above 10,000 meters. The effect of these strong winds on the averages is well shown in the excess of the resultant winds over the normal in Table 2.

The most pronounced instances of strong northwesterly winds aloft of more or less general occurrence over the eastern portion of the country, are noted in the last decade of the month, during which period vigorous extensive LOWS passing eastward and southeastward, were a dominant feature of pressure conditions over middle-northern and eastern sections. This relation between winds aloft and cyclonic movement is apparent in the conditions for the whole month, the average strong drift in the upper air from west-northwest being undoubtedly associated with the prevalent rapid movement of LOWS across the country in the same general direction. A possible connection may also be inferred between this characteristic of the winds during the month and the lack of LOWS moving from southwest, and consequent deficiency in frequency and amount of precipitation over middle-western sections.

The effect of the excess strength of the northwesterly winds aloft on the average temperature of the northwestern stations was to raise the temperature, as compared with the normal, rather than to depress it, as would usually be expected. This appears to have been due to the relatively warm northwesterly winds aloft observed in advance and in the rear of LOWS soon after their first appearance in the Northwest. An example of the latter case is given in the records of Drexel and Ellendale on the 3d, when these stations were in the rear of a well defined LOW that appeared the day before over the North Pacific coast. The upper-air records on this date show definitely higher temperatures at both stations in west to northwest winds than 24 hours previously in southerly winds at corresponding levels, when the stations were in the rear of a HIGH.

A pronounced instance of recovery of temperature in a northwesterly wind aloft preceding a LOW that had its origin over the Pacific is shown in the records of Ellendale and Drexel on the 29th. Low temperature for the season to the upper limit of observation on the 28th gave way on the 29th to a rapid rise in temperature in the upper levels in a northwest wind preceding a LOW approaching from the northwest. In the lower levels the wind was from a southerly direction and the temperature still low. This is a type of vertical temperature distribution occasionally observed in western sections in the colder seasons, when after a cold HIGH has passed the station, the south winds at low altitudes in its rear are still cold, while an approaching LOW from the northwest brings much warmer air in a northwesterly drift aloft. An extension of this warming up process to lower levels attending the passage of the LOW sometimes causes a condition to supervene, similar to that cited on the 3d.

In the following table giving temperatures at Drexel and Ellendale on the 28th and 29th, a comparison is made with temperatures on the same days at Due West, where at a number of upper levels temperatures below all previous records for the time of year were recorded, due to the transportation toward the southeast of cold

air that lay to the northward on the 28th. This table illustrates some of the peculiar horizontal temperature gradients frequently revealed in aerological records made in the colder season. It will be noted that there was an opposite temperature gradient, at the surface and aloft in a northwest-southeast direction between Ellendale and Due West.

| Altitude<br>m. s. l.<br>meters | Ellendale<br>(444 meters) |           | Drexel<br>(396 meters) |           | Due West<br>(217 meters) |           |
|--------------------------------|---------------------------|-----------|------------------------|-----------|--------------------------|-----------|
|                                | 28th                      | 29th      | 28th                   | 29th      | 28th                     | 29th      |
| Surface                        | -13.5 NNW.                | -5.5 SSW. | -6.6 WSW.              | -0.5 S.   | 0.7 SW.                  | 1.2 WNW.  |
| 500                            | -13.8 NNW.                | -5.7 SSW. | -6.6 W.                | -8.7 SSW. | 3.4 WSW.                 | 0.6 NW.   |
| 750                            | -15.3 NNW.                | -6.1 SW.  | -6.6 NW.               | -6.8 SW.  | 5.5 W.                   | -0.7 NW.  |
| 1,000                          | -16.8 NNW.                | -1.8 WSW. | -7.0 NNW.              | -4.4 WNW. | 4.4 WSW.                 | -2.2 WNW. |
| 1,250                          | -18.3 NNW.                | 2.5 W.    | -8.9 NNW.              | -3.1 NW.  | 3.2 WSW.                 | -3.8 WNW. |
| 1,500                          | -14.2 NNW.                | 6.8 WNW.  | -10.7 NNW.             | -2.4 NW.  | 2.0 WSW.                 | -4.4 WNW. |
| 2,000                          | -13.0 NNW.                | 4.0 WNW.  | -15.5 NW.              | -1.0 NW.  | -0.5 W.                  | -5.6 W.   |
| 2,500                          | -15.3 NNW.                | 0.2 NW.   | -13.1 NW.              | -1.7 NW.  | -----                    | -7.9 W.   |

The kite observation at Broken Arrow on the 13th, shown in the following table, is a good illustration of the vertical arrangement of wind directions attending the passage of a wind shift line over the station. The surface winds veered abruptly from southwest to north-northwest, accompanied by a drop of about 16° C. in temperature in three hours, while the winds aloft continued from a southwesterly direction till the end of the observation. No considerable precipitation occurred at Broken Arrow till the follow day, but a heavy shower occurred in connection with the wind shift line 15 miles west-northwest of the station.

Meteorological conditions over Broken Arrow, Okla., on November 13, 1924:

| Time, p. m. | Surface wind<br>direction | Altitude<br>m. s. l.<br>(m.) | Temper-<br>ature<br>(° C.) | Relative<br>humidity,<br>per cent | Wind<br>direction |
|-------------|---------------------------|------------------------------|----------------------------|-----------------------------------|-------------------|
| 12.28       | SW                        | 3,518                        | 0.8                        | 82                                | SW.               |
| 12.41       | NNW                       | 2,669                        | 4.8                        | 87                                | SSW.              |
| 12.46       | NW                        | 2,037                        | 8.0                        | 88                                | SSW.              |
| 1.06        | NNW                       | 1,003                        | 15.3                       | 74                                | SW.               |
| 1.12        | NNW                       | 619                          | 15.4                       | 94                                | NW.               |
| 1.19        | NNW                       | 1,233                        | 17.1                       | 97                                | NNW.              |

<sup>1</sup> Surface.

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during November, 1924

| Altitude,<br>m. s. l.<br>(m.) | Broken<br>Arrow,<br>Okla.<br>(233m.) |   | Drexel,<br>Nebr.<br>(396m.) |  | Due West,<br>S. C.<br>(217m.) |   | Ellendale,<br>N. Dak.<br>(444m.) |   | Groesbeck,<br>Tex.<br>(141m.) |   | Royal<br>Center,<br>Ind.<br>(225m.) |   |
|-------------------------------|--------------------------------------|---|-----------------------------|--|-------------------------------|---|----------------------------------|---|-------------------------------|---|-------------------------------------|---|
|                               | Mean                                 |   | Mean                        |  | Mean                          |   | Mean                             |   | Mean                          |   | Mean                                |   |
|                               | Mean                                 | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                        | De-<br>parture<br>from<br>10-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>4-yr.<br>mean | Mean                             | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                                | De-<br>parture<br>from<br>7-yr.<br>mean |
| Surface                       | 12.6                                 | +2.4                                    | 3.8                         | +0.1                                     | 11.1                          | -0.4                                    | -0.9                             | +1.0                                    | 13.4                          | +0.4                                    | 4.9                                 | 0.0                                     |
| 250                           | 12.5                                 | +2.4                                    | ---                         | ---                                      | 11.0                          | -0.3                                    | ---                              | ---                                     | 13.4                          | +0.6                                    | 4.7                                 | 0.0                                     |
| 500                           | 11.3                                 | +2.2                                    | 3.8                         | +0.2                                     | 10.0                          | -0.3                                    | -1.2                             | +0.7                                    | 13.4                          | +1.2                                    | 3.2                                 | 0.0                                     |
| 750                           | 10.1                                 | +1.8                                    | 3.5                         | +0.2                                     | 9.0                           | -0.2                                    | -1.6                             | +0.2                                    | 12.4                          | +0.9                                    | 2.3                                 | 0.0                                     |
| 1,000                         | 9.0                                  | +1.3                                    | 3.3                         | +0.1                                     | 7.9                           | -0.5                                    | -1.6                             | -0.1                                    | 11.3                          | +0.4                                    | 1.2                                 | -0.4                                    |
| 1,250                         | 8.2                                  | +1.1                                    | 3.3                         | +0.3                                     | 7.0                           | -0.8                                    | -1.3                             | +0.2                                    | 10.1                          | 0.0                                     | 0.1                                 | -1.0                                    |
| 1,500                         | 7.4                                  | +1.0                                    | 2.7                         | +0.2                                     | 6.0                           | -0.6                                    | -1.4                             | +0.4                                    | 8.8                           | -0.5                                    | -0.2                                | -0.8                                    |
| 2,000                         | 5.6                                  | +1.1                                    | 1.1                         | +0.3                                     | 4.2                           | -1.1                                    | -2.6                             | +0.7                                    | 6.9                           | -0.4                                    | -2.6                                | -1.5                                    |
| 2,500                         | 3.5                                  | +1.1                                    | ---                         | ---                                      | 3.4                           | 0.0                                     | -4.9                             | +0.6                                    | 6.7                           | +1.4                                    | -4.6                                | -1.7                                    |
| 3,000                         | 1.4                                  | +1.3                                    | -3.6                        | -0.5                                     | 0.7                           | -0.2                                    | -7.5                             | +0.5                                    | 4.4                           | +1.5                                    | -7.0                                | -1.9                                    |
| 3,500                         | -0.7                                 | +1.6                                    | -6.2                        | -0.6                                     | -2.2                          | -0.3                                    | -10.5                            | +0.3                                    | 1.5                           | +1.4                                    | -9.1                                | -2.0                                    |
| 4,000                         | -3.4                                 | +1.4                                    | -8.7                        | -0.8                                     | -5.9                          | -1.1                                    | -13.3                            | +0.4                                    | -0.9                          | +1.8                                    | -12.5                               | -2.4                                    |
| 4,500                         | -6.3                                 | +1.1                                    | -11.5                       | +0.7                                     | -9.3                          | -0.7                                    | ---                              | ---                                     | -3.7                          | +2.0                                    | ---                                 | ---                                     |
| 5,000                         | -9.6                                 | +0.6                                    | -14.3                       | +0.8                                     | -12.7                         | -0.7                                    | ---                              | ---                                     | ---                           | ---                                     | ---                                 | ---                                     |

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during November, 1924—Continued

| RELATIVE HUMIDITY (%)        |                                      |   |                             |  |                               |   |                                  |   |                               |   |                                     |   |
|------------------------------|--------------------------------------|---|-----------------------------|--|-------------------------------|---|----------------------------------|---|-------------------------------|---|-------------------------------------|---|
| Altitude<br>m. s. l.<br>(m.) | Broken<br>Arrow,<br>Okla.<br>(233m.) |   | Drexel,<br>Nebr.<br>(396m.) |  | Due West,<br>S. C.<br>(217m.) |   | Ellendale,<br>N. Dak.<br>(444m.) |   | Grossbeck,<br>Tex.<br>(141m.) |   | Royal<br>Center,<br>Ind.<br>(225m.) |   |
|                              | Mean                                 | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                        | De-<br>parture<br>from<br>10-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>4-yr.<br>mean | Mean                             | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                                | De-<br>parture<br>from<br>7-yr.<br>mean |
| Surface                      | 55                                   | -11                                     | 64                          | -7                                       | 70                            | +2                                      | 68                               | -11                                     | 74                            | -1                                      | 67                                  | -6                                      |
| 250                          | 55                                   | -11                                     | 64                          | -7                                       | 68                            | +1                                      | 67                               | -11                                     | 71                            | -1                                      | 67                                  | -6                                      |
| 500                          | 52                                   | -10                                     | 61                          | -7                                       | 60                            | -3                                      | 67                               | -10                                     | 64                            | -3                                      | 67                                  | -5                                      |
| 750                          | 51                                   | -9                                      | 58                          | -5                                       | 57                            | -3                                      | 66                               | -6                                      | 62                            | -1                                      | 66                                  | -3                                      |
| 1,000                        | 50                                   | -8                                      | 57                          | -1                                       | 57                            | -1                                      | 64                               | -3                                      | 60                            | 0                                       | 66                                  | 0                                       |
| 1,250                        | 48                                   | -7                                      | 55                          | 0  | 53                            | -3                                      | 61                               | -2                                      | 57                            | 0                                       | 64                                  | +2                                      |
| 1,500                        | 46                                   | -6                                      | 53                          | 0  | 50                            | -4                                      | 58                               | -1                                      | 56                            | +2                                      | 59                                  | +1                                      |
| 2,000                        | 41                                   | -7                                      | 48                          | -2                                       | 46                            | -2                                      | 52                               | -3                                      | 49                            | 0                                       | 61                                  | +7                                      |
| 2,500                        | 38                                   | -8                                      | 46                          | -4                                       | 33                            | -10                                     | 52                               | -3                                      | 25                            | -18                                     | 56                                  | +6                                      |
| 3,000                        | 33                                   | -12                                     | 46                          | -5                                       | 32                            | -9                                      | 53                               | -2                                      | 20                            | -19                                     | 54                                  | +6                                      |
| 3,500                        | 27                                   | -14                                     | 49                          | -3                                       | 30                            | -11                                     | 53                               | -3                                      | 19                            | -19                                     | 49                                  | +3                                      |
| 4,000                        | 20                                   | -16                                     | 52                          | 0  | 28                            | -13                                     | 56                               | -2                                      | 17                            | -18                                     | 49                                  | +6                                      |
| 4,500                        | 20                                   | -13                                     | 52                          | +2                                       | 28                            | -17                                     |                                  |   | 16                            | -18                                     |                                     |   |
| 5,000                        | 19                                   | -15                                     | 52                          | +4                                       | 28                            | -17                                     |                                  |   |                               |   |                                     |   |

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during November, 1924—Continued

| VAPOR PRESSURE (mb.)         |                                      |   |                             |  |                               |   |                                  |   |                               |   |                                     |   |
|------------------------------|--------------------------------------|---|-----------------------------|--|-------------------------------|---|----------------------------------|---|-------------------------------|---|-------------------------------------|---|
| Altitude<br>m. s. l.<br>(m.) | Broken<br>Arrow,<br>Okla.<br>(233m.) |   | Drexel,<br>Nebr.<br>(396m.) |  | Due West,<br>S. C.<br>(217m.) |   | Ellendale,<br>N. Dak.<br>(444m.) |   | Grossbeck,<br>Tex.<br>(141m.) |   | Royal<br>Center,<br>Ind.<br>(225m.) |   |
|                              | Mean                                 | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                        | De-<br>parture<br>from<br>10-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>4-yr.<br>mean | Mean                             | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                          | De-<br>parture<br>from<br>7-yr.<br>mean | Mean                                | De-<br>parture<br>from<br>7-yr.<br>mean |
|                              |                                      |   |                             |  |                               |   |                                  |   |                               |   |                                     |   |
| Surface ..                   | 8.07                                 | -0.12                                   | 5.18                        | -0.58                                    | 9.74                          | +0.36                                   | 3.84                             | -0.62                                   | 12.28                         | +0.47                                   | 6.14                                | -0.46                                   |
| 250 ..                       | 8.02                                 | -0.10                                   |                             |  | 9.53                          | +0.31                                   |                                  |   | 11.79                         | +0.42                                   | 6.07                                | -0.45                                   |
| 500 ..                       | 7.33                                 | -0.02                                   | 5.00                        | -0.51                                    | 8.05                          | -0.12                                   | 3.71                             | -0.67                                   | 10.62                         | +0.37                                   | 5.38                                | -0.43                                   |
| 750 ..                       | 6.62                                 | -0.10                                   | 4.56                        | -0.42                                    | 7.13                          | -0.18                                   | 3.47                             | -0.59                                   | 9.66                          | +0.44                                   | 4.89                                | -0.34                                   |
| 1,000 ..                     | 6.02                                 | -0.20                                   | 4.35                        | -0.21                                    | 6.44                          | -0.26                                   | 3.30                             | -0.46                                   | 8.59                          | +0.24                                   | 4.40                                | -0.25                                   |
| 1,250 ..                     | 5.46                                 | -0.22                                   | 4.14                        | -0.10                                    | 5.59                          | -0.43                                   | 3.18                             | -0.31                                   | 7.34                          | -0.07                                   | 3.92                                | -0.21                                   |
| 1,500 ..                     | 4.95                                 | -0.15                                   | 3.83                        | -0.09                                    | 4.72                          | -0.68                                   | 3.03                             | -0.20                                   | 6.43                          | -0.17                                   | 3.55                                | -0.13                                   |
| 2,000 ..                     | 3.79                                 | -0.27                                   | 3.07                        | -0.16                                    | 3.57                          | -0.57                                   | 2.55                             | -0.18                                   | 4.78                          | -0.29                                   | 3.17                                | +0.16                                   |
| 2,500 ..                     | 2.93                                 | -0.30                                   | 2.61                        | -0.10                                    | 1.98                          | -1.29                                   | 2.12                             | -0.20                                   | 2.10                          | -1.67                                   | 2.76                                | +0.37                                   |
| 3,000 ..                     | 2.05                                 | -0.57                                   | 2.19                        | -0.09                                    | 1.31                          | -1.31                                   | 1.75                             | -0.17                                   | 1.15                          | -1.59                                   | 2.41                                | +0.29                                   |
| 3,500 ..                     | 1.35                                 | -0.60                                   | 1.88                        | 0.00                                     | 0.61                          | -1.64                                   | 1.35                             | -0.21                                   | .89                           | -1.24                                   | 1.90                                | +0.19                                   |
| 4,000 ..                     | 0.80                                 | -0.52                                   | 1.61                        | +0.07                                    | 0.29                          | -1.51                                   | 1.01                             | -0.29                                   | .65                           | -0.86                                   | 1.56                                | +0.72                                   |
| 4,500 ..                     | 0.68                                 | -0.25                                   | 1.24                        | +0.06                                    | 0.19                          | -1.44                                   |                                  |   | .52                           | -0.50                                   |                                     |   |
| 5,000 ..                     | 0.53                                 | -0.23                                   | 0.96                        | +0.09                                    | 0.11                          | -1.44                                   |                                  |   |                               |   |                                     |   |

TABLE 2.—Free-air resultant winds (m. p. s.) during November, 1924

| Altitude,<br>m. s. l.<br>(m.) | Broken Arrow, Okla. (233m.) |      |             |      | Drexel, Nebr. (396m.) |      |              |      | Due West, S. C. (217m.) |      |             |      | Ellendale, N. Dak. (444m.) |      |             |      | Grossbeck, Tex. (141m.) |      |             |      | Royal Center, Ind. (225m.) |      |             |      |
|-------------------------------|-----------------------------|------|-------------|------|-----------------------|------|--------------|------|-------------------------|------|-------------|------|----------------------------|------|-------------|------|-------------------------|------|-------------|------|----------------------------|------|-------------|------|
|                               | Mean                        |      | 7-year mean |      | Mean                  |      | 10-year mean |      | Mean                    |      | 4-year mean |      | Mean                       |      | 7-year mean |      | Mean                    |      | 7-year mean |      | Mean                       |      | 7-year mean |      |
|                               | Dir.                        | Vel. | Dir.        | Vel. | Dir.                  | Vel. | Dir.         | Vel. | Dir.                    | Vel. | Dir.        | Vel. | Dir.                       | Vel. | Dir.        | Vel. | Dir.                    | Vel. | Dir.        | Vel. | Dir.                       | Vel. | Dir.        | Vel. |
| Surface.....                  | S. 64° W.                   | 3.4  | S. 48° W.   | 1.3  | S. 80° W.             | 2.4  | S. 82° W.    | 1.5  | S. 67° W.               | 0.8  | N. 73° W.   | 0.7  | N. 57° W.                  | 3.6  | N. 52° W.   | 2.3  | S. 2° E.                | 1.4  | N. 64° E.   | 0.2  | S. 61° W.                  | 3.8  | S. 46° W.   | 1.9  |
| 250.....                      | S. 55° W.                   | 3.4  | S. 45° W.   | 1.4  | S. 84° W.             | 3.2  | S. 84° W.    | 2.1  | S. 69° W.               | 3.4  | N. 86° W.   | 2.1  | N. 87° W.                  | 6.1  | N. 64° W.   | 4.0  | S. 25° W.               | 5.5  | S. 5° E.    | 1.2  | S. 70° W.                  | 6.4  | S. 57° W.   | 4.8  |
| 500.....                      | S. 61° W.                   | 4.7  | S. 38° W.   | 3.1  | S. 86° W.             | 5.2  | W.           | 3.7  | S. 87° W.               | 3.7  | N. 81° W.   | 2.1  | N. 87° W.                  | 6.1  | N. 64° W.   | 4.0  | S. 29° W.               | 6.2  | S. 22° W.   | 1.8  | S. 72° W.                  | 9.7  | S. 63° W.   | 6.3  |
| 750.....                      | S. 66° W.                   | 5.2  | S. 50° W.   | 3.8  | N. 88° W.             | 7.5  | N. 89° W.    | 5.1  | S. 83° W.               | 4.1  | N. 87° W.   | 2.7  | N. 64° W.                  | 7.0  | N. 67° W.   | 4.9  | S. 39° W.               | 7.7  | S. 43° W.   | 2.6  | S. 82° W.                  | 9.8  | S. 70° W.   | 6.9  |
| 1,000.....                    | S. 75° W.                   | 6.2  | S. 58° W.   | 4.6  | N. 86° W.             | 9.2  | N. 86° W.    | 6.1  | S. 85° W.               | 5.5  | N. 85° W.   | 4.0  | N. 72° W.                  | 7.9  | N. 70° W.   | 5.9  | S. 44° W.               | 8.2  | S. 59° W.   | 3.1  | S. 89° W.                  | 10.3 | S. 74° W.   | 7.7  |
| 1,500.....                    | S. 77° W.                   | 8.1  | S. 60° W.   | 5.3  | N. 82° W.             | 10.0 | N. 86° W.    | 7.1  | S. 85° W.               | 6.8  | N. 88° W.   | 5.4  | N. 59° W.                  | 9.6  | N. 65° W.   | 7.1  | S. 51° W.               | 7.0  | S. 67° W.   | 3.8  | N. 81° W.                  | 11.6 | S. 78° W.   | 8.3  |
| 2,000.....                    | S. 86° W.                   | 9.5  | S. 74° W.   | 6.7  | N. 80° W.             | 11.6 | N. 82° W.    | 8.2  | S. 74° W.               | 9.5  | S. 88° W.   | 7.4  | N. 64° W.                  | 11.7 | N. 66° W.   | 8.7  | S. 64° W.               | 7.7  | S. 79° W.   | 5.2  | N. 83° W.                  | 13.1 | S. 83° W.   | 9.8  |
| 2,500.....                    | S. 85° W.                   | 9.6  | S. 79° W.   | 7.3  | N. 79° W.             | 13.8 | N. 79° W.    | 10.0 | S. 66° W.               | 9.8  | S. 88° W.   | 8.9  | N. 80° W.                  | 11.9 | N. 68° W.   | 10.8 | S. 64° W.               | 7.8  | S. 85° W.   | 7.1  | N. 81° W.                  | 13.9 | S. 85° W.   | 11.4 |
| 3,000.....                    | S. 80° W.                   | 9.5  | S. 7° W.    | 8.7  | N. 82° W.             | 15.1 | N. 79° W.    | 11.2 | S. 40° W.               | 8.6  | S. 89° W.   | 10.0 | N. 82° W.                  | 14.0 | N. 69° W.   | 12.9 | S. 80° W.               | 9.6  | S. 86° W.   | 8.5  | N. 84° W.                  | 13.9 | N. 87° W.   | 12.7 |
| 3,500.....                    | S. 74° W.                   | 11.6 | S. 78° W.   | 9.3  | N. 79° W.             | 17.3 | N. 76° W.    | 12.1 | S. 26° W.               | 8.6  | S. 87° W.   | 11.9 | N. 71° W.                  | 13.3 | N. 67° W.   | 13.5 | S. 79° W.               | 11.1 | S. 76° W.   | 10.4 | N. 84° W.                  | 12.8 | N. 86° W.   | 12.3 |
| 4,000.....                    | S. 84° W.                   | 12.1 | S. 82° W.   | 11.0 | N. 85° W.             | 19.1 | N. 81° W.    | 13.6 | S. 45° W.               | 14.0 | W.          | 13.9 | N. 72° W.                  | 14.8 | N. 66° W.   | 13.1 | S. 87° W.               | 6.5  | S. 71° W.   | 8.5  | S. 45° W.                  | 19.0 | S. 82° W.   | 10.4 |
| 4,500.....                    | N. 60° W.                   | 10.1 | N. 85° W.   | 9.6  | N. 87° W.             | 19.6 | N. 85° W.    | 14.2 | S. 45° W.               | 14.0 | N. 87° W.   | 15.4 | N. 68° W.                  | 19.0 | N. 61° W.   | 16.0 | S. 77° W.               | 12.8 | S. 67° W.   | 10.4 | S. 45° W.                  | 20.0 | S. 79° W.   | 9.1  |
| 5,000.....                    | N. 64° W.                   | 10.7 | S. 76° W.   | 11.3 | N. 77° W.             | 17.3 | N. 79° W.    | 13.5 | S. 45° W.               | 14.0 | N. 85° W.   | 14.7 |                            |      |             |      |                         |      |             |      |                            |      |             |      |

## THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

## PRESSURE AND WINDS

The anticyclonic conditions persisting so constantly over the Ohio Valley and Northeastern States during October gave way during November, particularly over the more northeastern districts, although the pressure continued high to the southward and anticyclones dominated the weather over the plateau and most other western districts. As a result of this pressure distribution few important cyclones formed over the South or Southwest, and those entering the United States from the Canadian Northwest moved eastward mainly along the northern border.

In the absence of cyclonic disturbances the drought conditions that had set in during October or earlier over many southern and eastern districts continued more or less severe during much of November. The first notable cyclone to give important precipitation to the eastward of the Rocky Mountains moved to the Great Lakes by the morning of the 7th and considerable precipitation occurred in that region in connection therewith, but the storm was quickly dissipated. About the same time, however, some heavy rains occurred over the far Northwest.

Precipitation again occurred in the vicinity of the Great Lakes on the 11th and 12th, due to a shallow depression moving eastward near the northern border. Light precipitation from this depression extended southward into the lower Ohio and middle Mississippi Valleys, and scattered local falls occurred over the Northeastern States. A considerable area of precipitation, though mostly light, extended from the middle and upper Mississippi Valley northeastward and eastward to New England on the 13th and 14th, attending a shallow cyclone that developed over the Ohio Valley on the 13th. About the 18th to 20th material precipitation occurred over the far Northwest, extending into the coast districts of northern California where, in the vicinity of Eureka, the fall was unusually heavy, causing considerable damage to bridges, etc.

The first important precipitation of the month over the Atlantic Coast States occurred in connection with a low-pressure area that moved from North Carolina to New England from the 21st to 23d. Heavy rains occurred in connection with this storm over most of the Atlantic States from Georgia northward, and rains or snows, mostly light, extended westward during the same period into the Ohio Valley and Great Lakes region in connection with a low-pressure area that moved northeastward over the upper Lakes. Light precipitation, mostly snow, occurred on the 24th and 25th over a wide